# Making Consumption Aggregates Comparable

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- Poverty rate comparisons across countries inform resource allocation and policy design.

- Yet the welfare aggregates underlying poverty rates are not comparable.

- This matters, because differences in how welfare is measured can have large impacts on measured poverty.
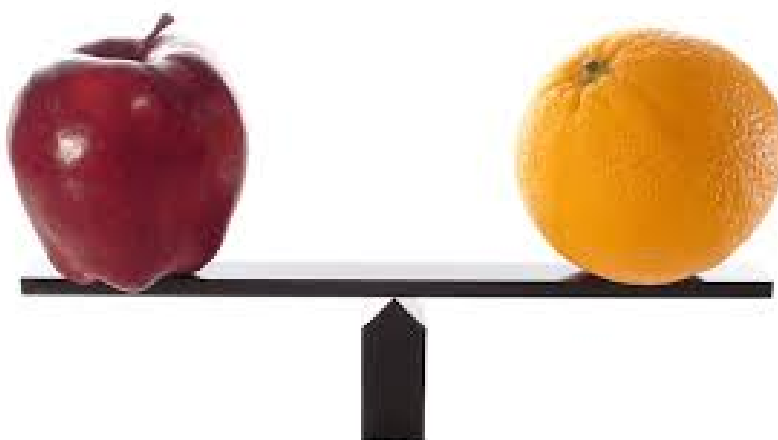
New surveys mechanically increase measured consumption
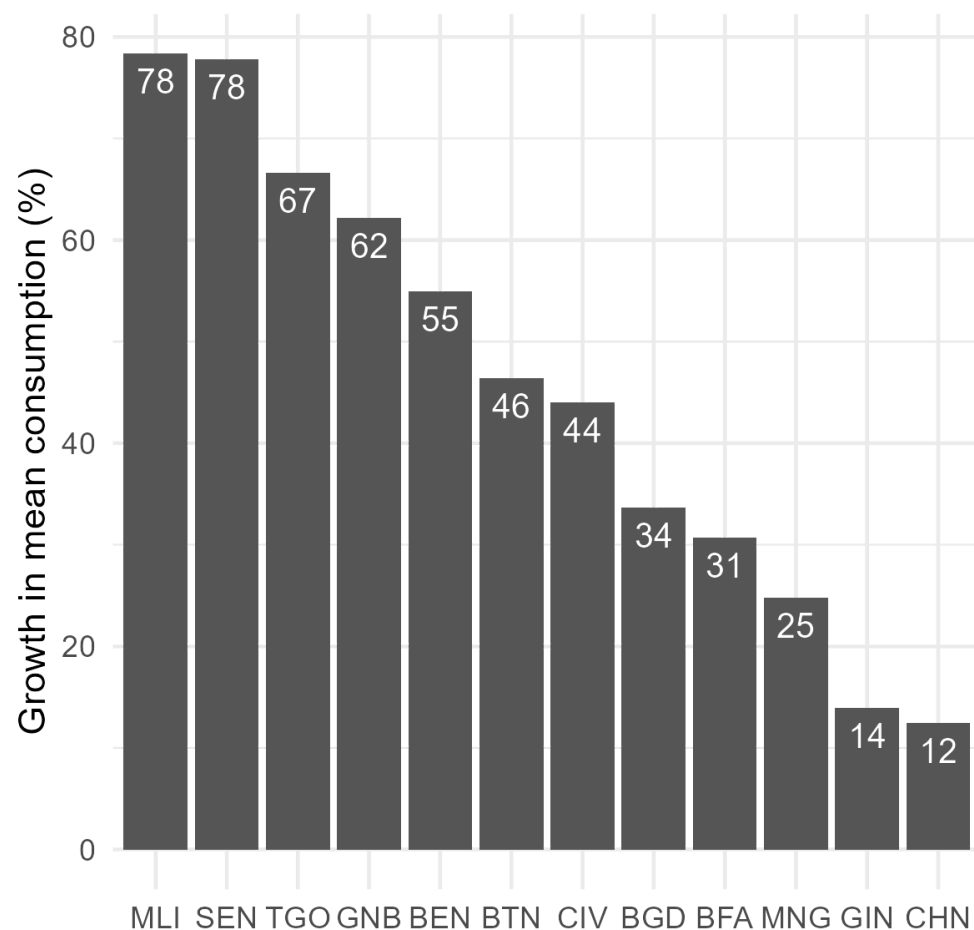
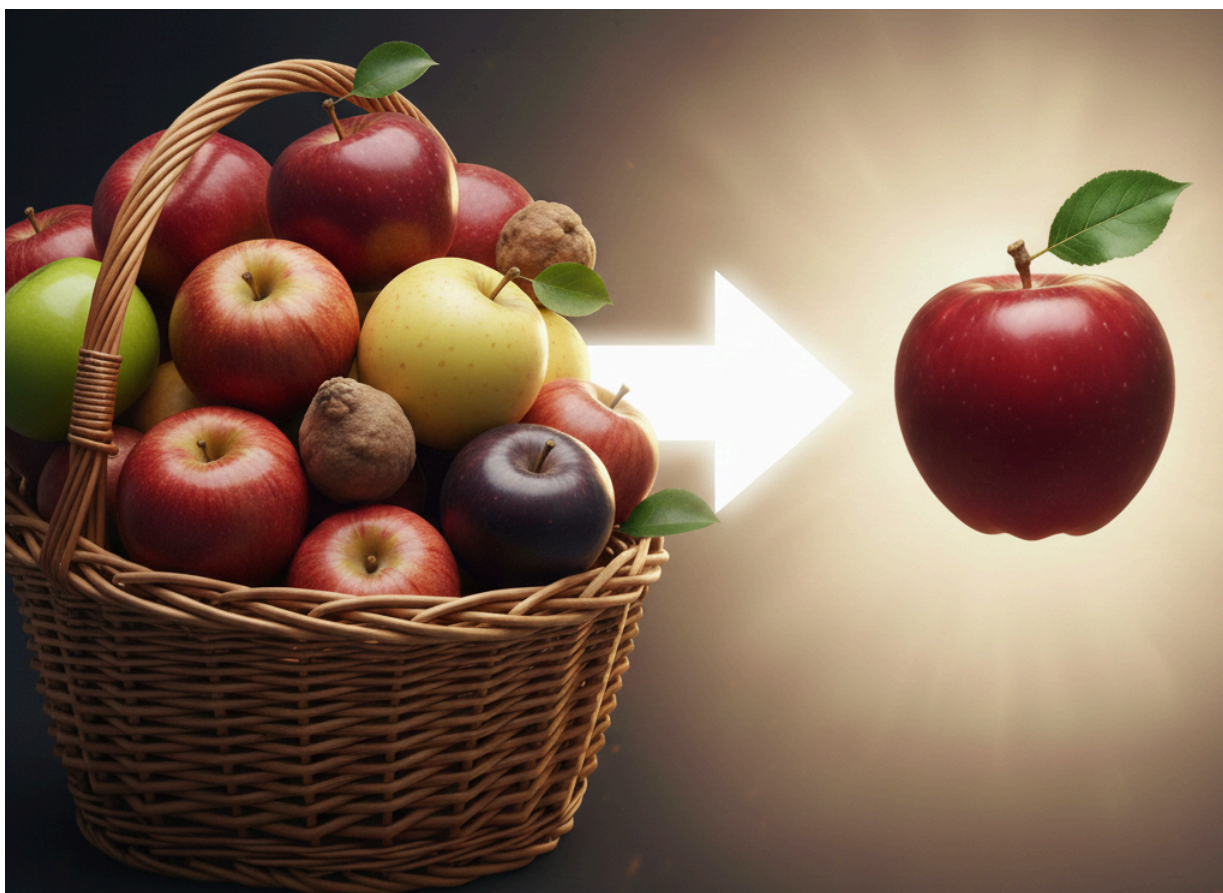# Comparability issues

Lack of comparability arises due to differences in measurement of

1. income or consumption

2. consumption across countries

3. consumption within countries over time

4. income across countries

5. income within countries over time

Research question

How can we make consumption distributions comparable across countries?

Data

The Poverty and Inequality Platform (PIP)

- The source of monetary poverty and inequality estimates for the SDGs

- Contains poverty estimates from 2500+ surveys spanning 170+ countries

- Mostly comes from national statistical offices, but also EU-SILC, LIS, and SEDLAC for income distributions

- Contains information on whether welfare aggregates within countries are comparable over time

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Why are consumption aggregates in PIP not fully comparable?

1. For some countries, we are 'consumption-aggregate-takers'

2. Survey design prevents inclusion of all components

3. Survey design causes differences in measurement of components

4. Quality-comparability trade-off

5. Harmonization practices differ across countries

Why has this issue not been resolved?

1. Main objective has been to study national poverty

2. No obvious solution exists.

3. Comparability of poverty lines and currency (CPI/PPP) has been prioritized

4. Priority has been on filling data gaps

5. Consumption comparability issues used to be less significant.

6. There is a trade-off between modeled approaches and country buy-in

How are other IOs dealing with comparability issues?
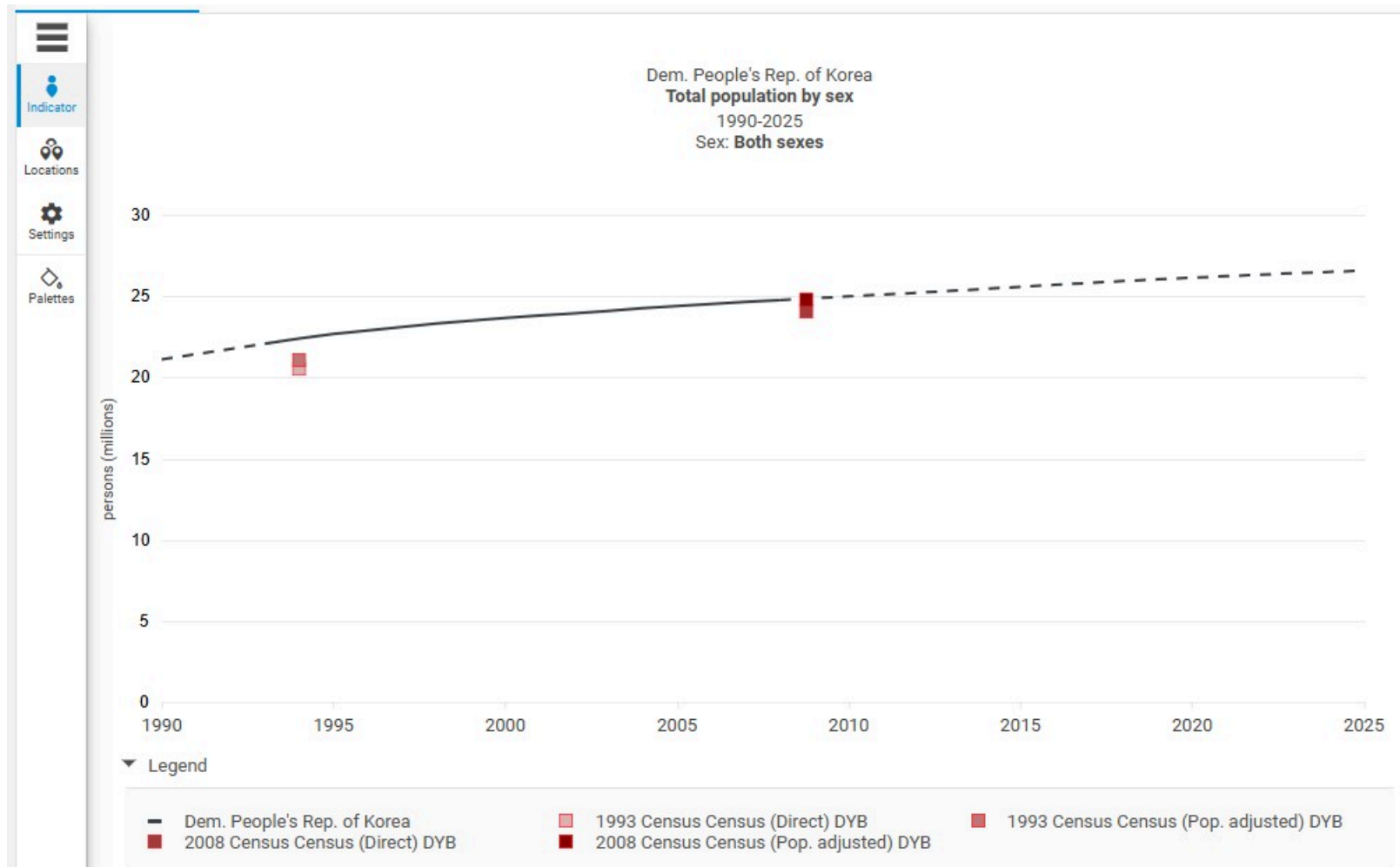
Question 1

Which consumption concept did you use?

Whatever is used by countries for national poverty and inequality reporting.

What are its strengths and weaknesses?

Weakness: Lack of cross-country comparability, at times outdated methodologies.

Strength: Country buy-in

What limitations would you have liked to address?

Lack of cross-country comparability, lack of metadata

The Poverty Measurement Database (PMD)

- Includes more than 200 questions on the construction of welfare aggregates and national poverty lines

- Filled out with the help of an AI algorithm that browses through poverty and household survey reports from national statistical offices and the World Bank

- Followed by human cross-checking

- Contains a substantial amount of missing information when details are unknown

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The Poverty Measurement Database (PMD)

Were the food consumption component collected using this time frequency?								
Food: 1week	Food: 2week	Food: 3week	Food: 4week	Food: 1month	Food: 3months	Food: 6months	Food: 12month h	Food: (Other: Specify)
a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No
Were the non-food consumption component collected using this time frequency?								
Non-Food: 1week	Non-Food: 2week	Non-Food: 3week	Non-Food: 4week	Non-Food: 1month	Non-Food: 3months	Non-Food: 6months	Non-Food: 12month h	Non-Food: (Other: Specify)
a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No	a-Yes b-No

1- Food (consumed at home)	a- Yes b- No	2.1- Meals consumed outside the home: Which level?	a- Individual b- Household

The Poverty Measurement Database (PMD)

Are adjustments made to outliers?	Are adjustments made to missing values?
a- No adjustment	a- No adjustment
b- Drop	b- Drop
c- Replace with zero	c- Replace with zero
d- Replace with national Mean/Median	d- Replace with national Mean/Median
e- Replace with subnational Mean/Median	e- Replace with subnational Mean/Median
f- Replace with cluster Mean/Median	f- Replace with cluster Mean/Median
g- Use a model to predict by Household	g- Use a model to predict by Household
h- Set Min and Max values	h- Set Min and Max values
i- Don't Know	i- Don't Know
j- Other (Specify)	j- Other (Specify)

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The Poverty Measurement Database (PMD)

Are spatial adjustments made to the consumption aggregate?	If yes: What type of price index is used?	If yes: What is the domain of the price index?	If yes: What is the source of the data for the price index?	If yes: What is the reference area?	If both temporal and spatial adjustments are made, are they made simultaneously with a single index?
a- Yes b- No	a- Laspeyres b- Paasches c- Fisher d- Törnqvist e- Don't Know f- Other (Specify)	a- Urban/Rural b- Admin1 c- Admin2 d- Admin3 e- Admin1 and urban/rural f- Admin2 and urban/rural	a- Official CPI b- Unit values from household survey c- Price from Household survey d- Price survey e- Don't Know f- Other (Specify)	a- National Average b- Capital city c- Other (Specify)	a- Yes b- No c- Not Applicable

Issues particularly relevant for poverty comparisons

- Recall or diary

- Recall periods for food items

- Recall periods for non-food items

- Food-away-from-home included

- Durable goods included

- Housing included

- Spatial deflation accounted for

Method

Intuition

1. Define the "best practice" consumption aggregate:

   - Durable goods, housing, food-away-from-home included

   - Spatial deflation accounted for

   - Multiple recall periods for food and non-food

2. Predict what consumption aggregates would have looked like in all countries

3. Compare poverty rates across countries

Modeling the impact

- Denote the inclusion of housing in the consumption aggregate as $x = 1$ and $x = 0$ otherwise.

- We want to estimate the impact of adding housing on mean consumption (y) in country, c, year, t:

$$ln(y_{ct}) = \beta_0 + \beta_1 * x_{ct} + \epsilon_{ct}$$

- The impact likely depends on a country's income level

$$ln(y_{ct}) = \beta_0 + \beta_1 * x_{ct} + \textcolor{red}{\beta_2 * x_{ct} * ln(GDP_{ct})} + \epsilon_{ct}$$

- The impact likely differs within countries as well. Suppose we now observe mean consumption per decile, d.

$$ln(y_{dct}) = \beta_0 + \beta_1 * x_{ct} + \beta_2 * x_{ct} * ln(GDP_{ct}) + \textcolor{red}{\beta_3 * x_{ct} * d_{ct}} + \epsilon_{c,t}$$

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Empirical challenges

1. We have 12 different x's; with OLS, we would severely overfit

2. Strong linearity assumptions

3. Variation may be due to factors correlated with measurement choices and well-being.

Our approach

- Use gradient boosting to predict consumption.

- Where possible, subtract elements from welfare aggregates (such as removing housing) to minimize omitted variable bias.

Towards comparable consumption aggregates

- $ln(y_{dct}) = f(\mathbf{x_{ct}}, GDP_{ct}, d)$

- Predicted log consumption with current measurement choices $= ln(\hat{y}_{dct})$

- Define the best practice measurement choices with *, i.e. $x^*_{housing} = 1$

- Predicted log consumption with best practice measurement choices $= ln(\hat{y}^*_{dct})$

- Adjusted consumption aggregate $= ln(y_{dct}) + (ln(\hat{y}^*_{dct}) - ln(\hat{y}_{dct}))$

Uzbekistan 2002

Survey distribution
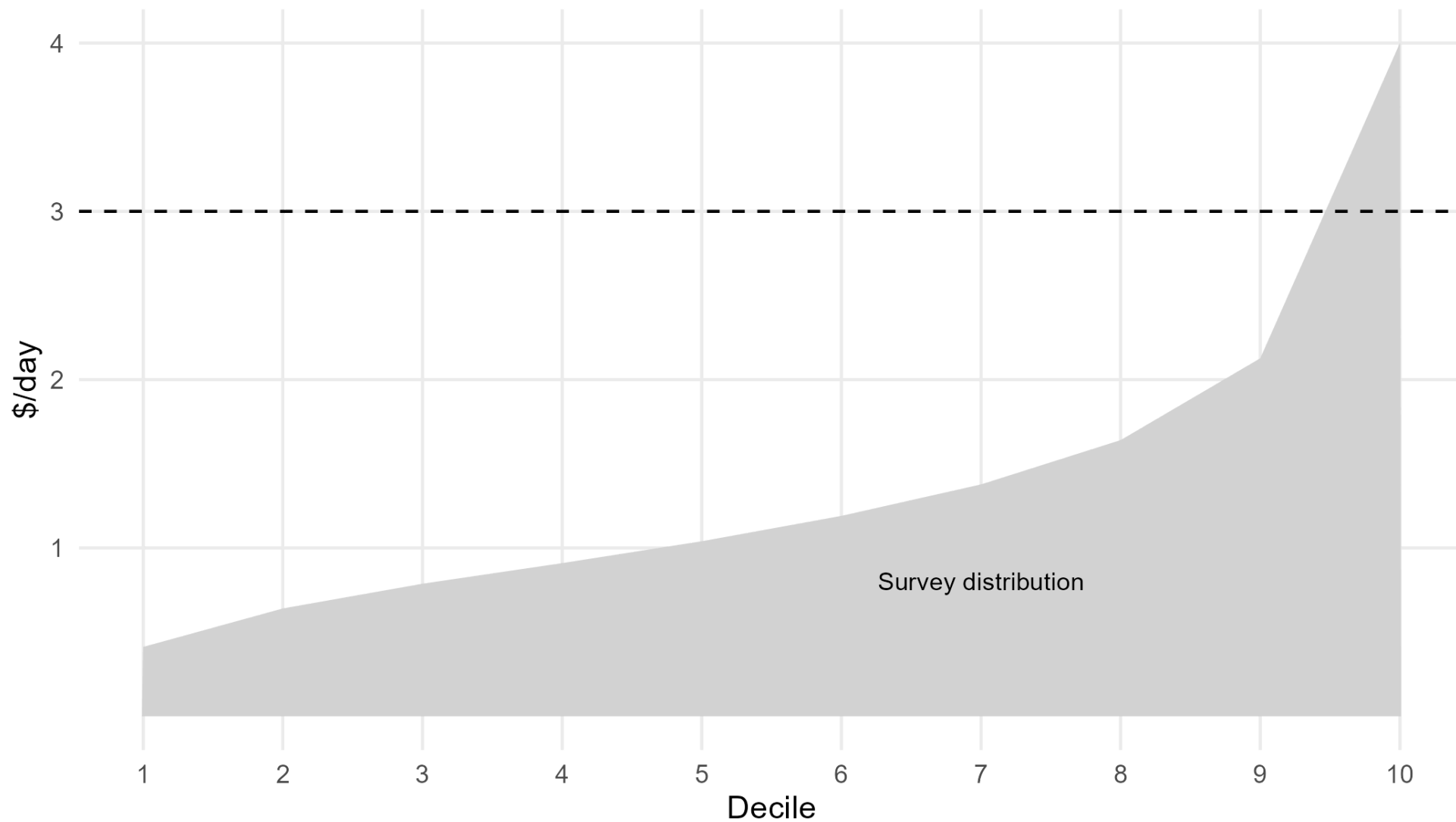
Uzbekistan 2002
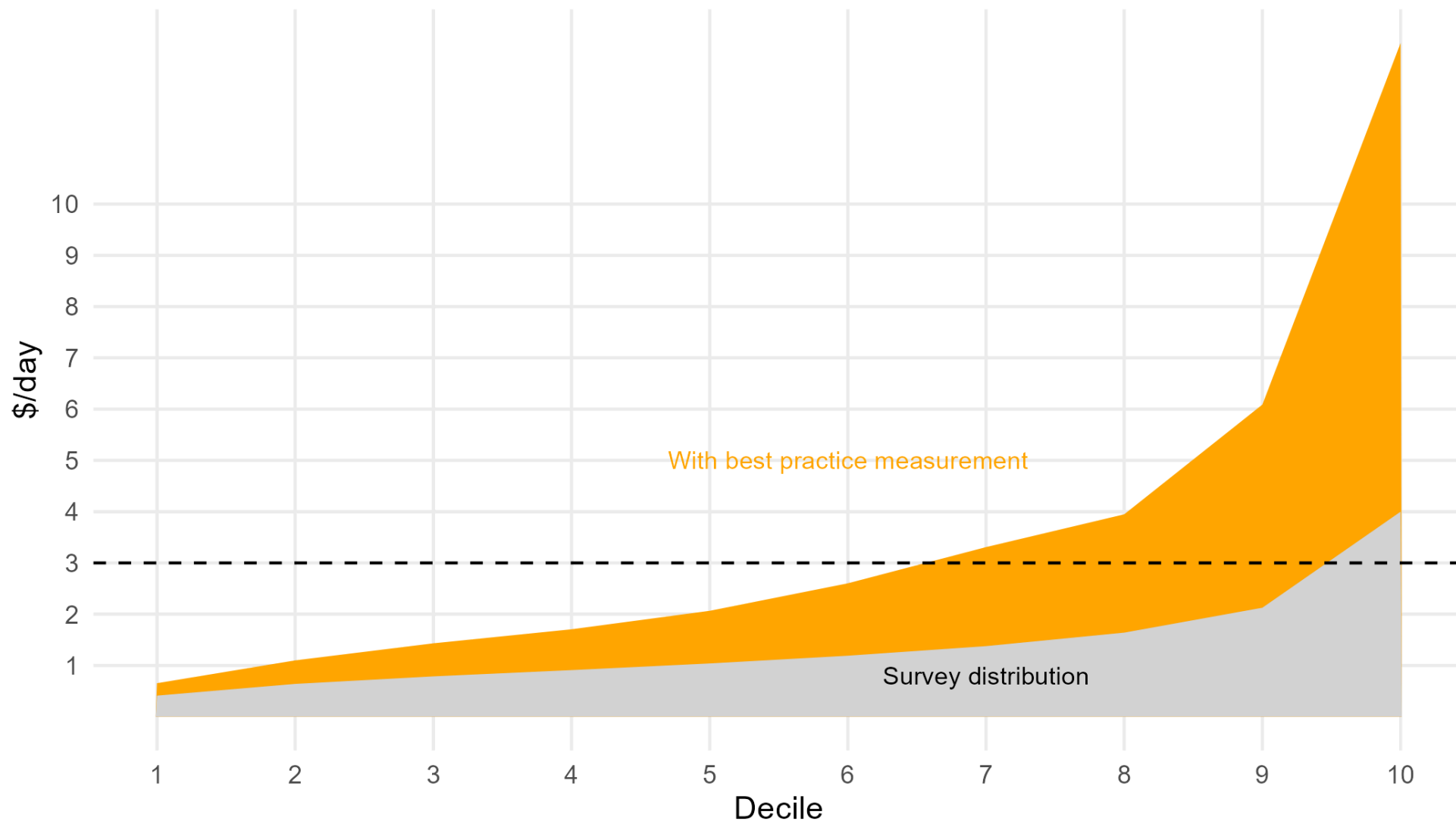
Question 2 & 3

Overall thoughts

- You have a very advanced user base and do not have to settle on one aggregate, or even a couple of aggregates

- Some will use it for welfare analysis, others for expenditure

- Main consideration is the opportunity cost of any decision

What are the implications of not including social transfers in kind?

- You get further away from capturing some comprehensive measure of welfare

- Your estimates are less comparable in the welfare space, more in the expenditure space

- You save a lot of time and headaches

Question 2 & 3

Health expenditure

- I would include it
- I understand it is a regrettable necessity; so is bottled water, home security systems, etc.

Spatial and temporal deflation

- Very few people know how to do it
- I would include it, even at a high opportunity cost

Operational comparability

- A necessary concept to invoke
- Makes sense to me for housing and durables, less so for food and non-food